

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claims 1-35 (canceled).

Claim 36 (withdrawn). A method for producing a piezoelectric device, comprising the steps of:

- producting a stack of ceramic green foil comprising binder and electrode layers formed by stacking and laminating green foils; and
- debinding said stack of ceramic green foils in an atmosphere comprising an inert gas and oxygen, whereby the oxygen content is reduced by adding an apt amount of hydrogen such that said electrode layers are not damaged.

Claim 37 (withdrawn). The method according to claim 36, wherein said step of debinding is carried out at a temperature in a range between and including 150 to 600°C.

Claim 38 (withdrawn). The method according to claim 36, wherein said atmosphere includes hydrogen with a partial pressure of up to and including 200 mbar.

Claim 39 (withdrawn). The method according to claim 37, wherein said atmosphere includes hydrogen with a partial pressure of up to and including 200 mbar.

Claim 40. (withdrawn) The method according to claim 36 further comprising the step of sintering said stack at a temperature which is below melting point of copper, said sintering occurring in an atmosphere comprising nitrogen, hydrogen and steam, and wherein oxygen partial pressure is set by an apt hydrogen concentration such that equilibrate partial pressure of equilibrium  $\text{Cu}/\text{Cu}_2\text{O}$  is not exceeded.

Claim 41 (withdrawn). The method according to claim 37 further comprising the step of sintering said stack at a temperature which is below melting point of copper, said sintering occurring in an atmosphere comprising nitrogen, hydrogen and steam, and wherein oxygen partial pressure is set by an apt hydrogen concentration such that equilibrate partial pressure of equilibrium  $\text{Cu}/\text{Cu}_2\text{O}$  is not-exceeded.

Claim 42 (withdrawn). The method according to claim 38 further comprising the step of sintering said stack at a temperature which is below melting point of copper, said sintering occurring in an atmosphere comprising nitrogen,

hydrogen and steam, and wherein oxygen partial pressure is set by an apt hydrogen concentration such that equilibrate partial pressure of equilibrium  $\text{Cu}/\text{Cu}_2\text{O}$  is not exceeded.

Claims 43 and 44 (canceled).

Claim 45 (currently amended). An intermediate product in the production of ~~an electric~~ a piezoelectric device, comprising a stack of at least two greenfoils of piezoelectric ceramic ~~greenfoils~~ material containing a binder, and an electrode layer containing elementary copper ~~set in~~ between said two ~~ceramic~~ greenfoils.

Claim 46 (previously presented). The intermediate product according to claim 45, wherein said electrode layer consists essentially of copper.

Claim 47 (new). A piezoelectric device, comprising a monolithic multilayer stack of at least two piezoelectric ceramic layers and an electrode layer in between said two ceramic layers, said electrode layer containing copper.

Claim 48 (new). The device according to claim 47, wherein said multilayer stack is produced from ceramic green foils containing a thermohydrolytically degradable binder.

Claim 49 (new). The device according to claim 48, wherein said binder is a polyurethane dispersion.

Claim 50 (new). The device according to claim 48, wherein a density of said ceramic layers is at least 96% of a theoretically obtainable density thereof.

Claim 51 (new). The device according to claim 47, wherein a density of said ceramic layers is at least 96% of a theoretically obtainable density thereof.

Claim 52 (new). The device according to claim 47, wherein said ceramic layers contain grains having a grain size in a range between and including 0.8 and 5  $\mu\text{m}$ .

Claim 53 (new). The device according to claim 48, wherein said ceramic layers contain grains having a grain size in a range between and including 0.8 and 5  $\mu\text{m}$ .

Claim 54 (new). The device according to claim 50, wherein said ceramic layers contain grains having a grain size in a range between and including 0.8 and 5  $\mu\text{m}$ .

Claim 55 (new). The device according to claim 47, wherein said

device includes at least 10 stacked electrode layers.

Claim 56 (new). The device according to claim 48, wherein said device includes at least 10 stacked electrode layers.

Claim 57 (new). The device according to claim 50, wherein said device includes at least 10 stacked electrode layers.

Claim 58 (new). The device according to claim 52, wherein said device includes at least 10 stacked electrode layers.

Claim 59 (new). The device according to claim 47, wherein said ceramic layers contain a ferroelectrical perovskite-ceramic having a general composition  $ABO_3$ .

Claim 60 (new). The device according to claim 48, wherein said ceramic layers contain a ferroelectrical perovskite-ceramic having a general composition  $ABO_3$ .

Claim 61 (new). The device according to claim 50, wherein said ceramic layers contain a ferroelectrical perovskite-ceramic having a general composition  $ABO_3$ .

Claim 62 (new). The device according to claim 52, wherein said ceramic layers contain a ferroelectrical perovskite-ceramic

having a general composition  $ABO_3$ .

Claim 63 (new). The device according to claim 55, wherein said ceramic layers contain a ferroelectrical perovskite-ceramic having a general composition  $ABO_3$ .

Claim 64 (new). The device according to claim 59, wherein said perovskite-ceramic is of a PZT type  $Pb(Zr_xTi_{1-x})O_3$ .

Claim 65 (new). The device according to claim 59, wherein cations are built on A-positions of the ceramic and where cations on B-positions are replaced by suitable other cations or combinations of cations.

Claim 66 (new). The device according to claim 64, wherein cations are built on A-positions of the ceramic and where cations on B-positions are replaced by suitable other cations or combinations of cations.

Claim 67 (new). The device according to claim 65, wherein bivalent metal cations  $M^{II}$  are built in on A-positions of the ceramic.

Claim 68 (new). The device according to claim 67, wherein said bivalent metal cations  $M^{II}$  are selected from a group comprising

barium, strontium, calcium, and copper.

Claim 69 (new). The device according to claim 67, wherein partially trivalent metal cations  $M^{III}$  are built on the A-positions of said ceramic, and said metal cations  $M^{III}$  are selected from a group comprising scandium, yttrium, bismuth, and lanthanum.

Claim 70 (new). The device according to claim 67, wherein partially trivalent metal cations  $M^{III}$  are built on the A-positions of said ceramic, and said metal cations  $M^{III}$  are selected from the lanthanide group.

Claim 71 (new). The device according to claim 67, wherein monovalent cations are integrated on the A-positions of said ceramic.

Claim 72 (new). The device according to claim 71, wherein said monovalent cations are selected from a group comprising silver, copper, sodium, and potassium.

Claim 73 (new). The device according to claim 67, wherein combinations of bivalent metal cations  $M^{II}$  and monovalent cations are integrated on the A-positions of said ceramic.

Claim 74 (new). The device according to claim 71, wherein combinations of bivalent metal cations  $M^{II}$  and monovalent cations are integrated on the A-positions of said ceramic.

Claim 75 (new). The device according to claim 63, wherein for partial substitution of quadrivalent cations Zr and Ti on B-positions of said perovskite ceramic, combinations of at least two of monovalent and quintvalent metal cations  $M^I_{1/4}M^V_{3/4}$ , with  $M^I = Na, K$  and  $M^V = Nb, Ta$  are used.

Claim 76 (new). The device according to claim 63, wherein for partial substitution of quadrivalent cations Zr and Ti on B-positions of said perovskite ceramic, at least one of bivalent and quintvalent metal cations  $M^{II}_{1/3}M^V_{2/3}$  with  $M^{II} = Mg, Zn, Ni, Co$  and  $M^V = Nb, Ta$  are used.

Claim 77 (new). The device according to claim 63, wherein for partial substitution of quadrivalent cations Zr and Ti on B-positions of said ferroelectrical perovskite ceramic, at least one of trivalent and quintvalent metal cations  $M^{III}_{1/2}M^V_{2/3}$  with  $M^{III} = Fe, In, Sc, \text{ heavier lanthanide elements}$  and  $M^V = Nb, Ta$  are used.

Claim 78 (new). The device according to claim 63, wherein for partial substitution of quadrivalent cations Zr and Ti on B-



positions of said ferroelectrical perovskite ceramic, combinations of at least two of  $M^{III}_{2/3}M^{VI}_{1/3}$  with  $M^{III} = \text{Fe, In, Sc}$ , heavier lanthanide elements and  $M^{VI} = \text{W}$  are used.

Claim 79 (new). The device according to claim 63, wherein for partial substitution of quadrivalent cations Zr and Ti on the B-positions of ferroelectrical perovskite ceramic, combinations of  $M^{II}_{1/2}M^{VI}_{1/2}$  with  $M^{II} = \text{Mg, Co, Ni}$  and  $M^{VI} = \text{W}$  are used.

Claim 80 (new). The device according to claim 66, wherein said ceramic comprises  $\text{Pb}_{1-x-y}\text{SE}_x\text{Cu}_y\text{V}'''_{x/2}(\text{Zr}_{0.54-z}\text{Ti}_{0.46+z})\text{O}_3$ , where  $\text{V}'''$  represents a vacancy, a PbO surplus is set from 1 to maximally 5 mol-%, SE is a rare earth metal, and  $0.01 < x < 0.05$ ,  $-0.15 < z < 0.15$ ,  $0 < y < 0.06$ .

Claim 81 (new). The device according to claim 66, wherein said ceramic includes an additive of CuO.

Claim 82 (new). A piezoelectric device, comprising a monolithic multilayer stack of at least two piezoelectric ceramic layers and an electrode layer in between said two ceramic layers, said electrode layer containing copper layered in between two ceramic greenfoils and sintered together with

Appl. No. 09/736,266

Amdt. dated February 10, 2004

Reply to Office action of September 15, 2003

said greenfoils to form said stack of said two piezoelectric ceramic layers and said electrode layer.